

§ 36.45

fuel:air ratio shall be designated as the maximum allowable fuel rate for operating the equipment at elevations not exceeding 1,000 feet above sea level.

(b) When the carbon monoxide content of the exhaust exceeds 0.30 percent, by volume, only near maximum power output, the maximum fuel:air ratio at which carbon monoxide does not exceed 0.30 percent shall be calculated and designated as the maximum allowable fuel:air ratio. The corresponding calculated liquid fuel rate shall be designated as the maximum allowable fuel rate at elevations not exceeding 1,000 feet above sea level.

NOTE: The applicant may be requested to adjust the liquid fuel rate during tests to determine the maximum allowable fuel:air ratio.

(c) The maximum allowable fuel:air ratio and maximum liquid fuel rates shall be used to calculate a liquid fuel rate-altitude table that shall govern the liquid fuel rate of engines operated at elevations exceeding 1,000 feet above sea level.

§ 36.45 Quantity of ventilating air.

(a) Results of the engine tests shall be used to calculate ventilation (cubic feet of air per minute) that shall be supplied by positive air movement when the permissible mobile diesel-powered transportation equipment is used underground. This quantity shall be stamped on the approval plate. The quantity so determined shall apply when only one machine is operated.

(b) Determination of the ventilation rate shall be based upon dilution of the exhaust gas with normal air. The most undesirable and hazardous condition of engine operation prescribed by MSHA shall be used in the calculations. The concentration of any of the following individual constituents in the diluted mixture shall not exceed:

0.25 percent, by volume, of carbon dioxide (CO_2).

0.005 percent, by volume, of carbon monoxide (CO).

0.00125 percent, by volume, of oxides of nitrogen (calculated as equivalent nitrogen dioxide, NO_2).

The oxygen (O_2) content of the diluted mixture shall be not less than 20 percent, by volume. The maximum quantity of normal air to produce the above

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dilution shall be designated the ventilation rate.

NOTE: This ventilation rate will provide a factor of safety for exposure of persons to air mixtures containing harmful or objectionable gases and for minor variations in engine performance.

§ 36.46 Explosion tests of intake and exhaust systems.

(a) Explosion tests to determine the strength of the intake and exhaust systems to withstand internal explosions and the adequacy of the flame arresters to prevent the propagation of an explosion shall be made with the systems connected to the engine or the systems simulated as connected to the engine. The system shall be filled with and surrounded by an explosive natural gas-air mixture. The mixture within the intake and exhaust systems shall be ignited by suitable means and the internal pressure developed by the resultant explosion shall be determined. Tests shall be conducted with the ignition source in several different locations to determine the maximum pressure developed by an internal explosion.

(b) Explosion tests shall be made with the engine at rest and with the flammable natural gas-air mixtures in the intake and exhaust systems. In other tests with the flammable mixture in motion, the engine shall be driven (externally) at speeds prescribed by MSHA but no liquid fuel shall be supplied to the injection valves.

(c) The temperature of the flame arresters in the intake or exhaust systems shall not exceed 212 °F. when an explosion test is conducted. Any water-spray cooling for the exhaust system shall not be operated and water shall not be present in the exhaust cooling boxes except when water is the cooling agent for a cooling box designed to act as a flame arrester, in which case MSHA will prescribe the test conditions.

(d) The explosion tests of the intake and exhaust systems shall not result in:

(1) Discharge of visible flame from any joint or opening.

(2) Ignition of surrounding flammable gas-air mixture.